



GYP SUM

By Lawrence L. Davis



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GYPSUM

By Lawrence L. Davis

Mr. Davis, a physical scientist with 35 years of industry and U.S. Bureau of Mines experience, has been the commodity specialist for gypsum since 1985. Domestic survey data were prepared by Virginia Harper, mineral data assistant; and international data tables were prepared by William L. Zajac, Chief, Section of International Data.

Demand for gypsum products decreased in 1990, a result of decreased construction activity, especially in new housing starts that decreased 13% to 1.2 million units. Crude gypsum mined, calcined gypsum produced, and shipments of wallboard products were all lower than the record highs set in 1989.

Sales of gypsum products decreased slightly to 26 million short tons, and value decreased 11% to \$1.7 billion. Increased competition caused lower prices for gypsum products. Imports for consumption of crude gypsum decreased 6% to about 8.7 million tons. Total value of gypsum product exports increased 40% to \$84 million.

DOMESTIC DATA COVERAGE

Domestic production data for gypsum are developed by the U.S. Bureau of Mines from a survey of U.S. gypsum operations. Of the 132 operations to which the annual survey request was sent, 100 responded, representing 96% of the total crude gypsum production shown in tables 1 and 2. Non-respondents were estimated from monthly and quarterly canvasses or from previous years data.

TABLE 1 to be inserted here.

BACKGROUND

Definitions, Grades, and Specifications

Gypsum has a composition of 79% calcium sulfate and 21% water, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, and is used as a commercial and generic term for all calcium sulfate materials. The well-formed transparent crystalline variety is called selenite. The massive variety is called alabaster and can be easily carved. The fibrous, silky variety is called satin spar. Gypsite is a mixture of clay and gypsum crystals.

Anhydrite is calcium sulfate, CaSO_4 , with no water of crystallization. It is a naturally occurring mineral often associated with gypsum. When gypsum is calcined at high temperatures, it is converted to anhydrite.

Commercially calcined gypsum, $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$, is a manufactured hemihydrate product produced by partial calcination of gypsum. It is produced by heating gypsum at temperatures to 350° F. Commonly called plaster of paris, when water is added to form a paste, it quickly sets and hardens to form gypsum again.

Byproduct gypsum is a chemical product of manufacturing processes such as phosphoric acid, hydrofluoric acid, citric acid, and titanium dioxide from ilmenite, consisting essentially of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. The sludge produced from scrubbers in the desulfurization of stack gas in thermal powerplants is also byproduct gypsum.

Keene's cement is anhydrous gypsum plaster with certain accelerator additives. It is produced by special high-temperature calcining. All of these minerals and materials, including the articles molded from the plaster, are commonly called gypsum or plaster.

Industry Structure

The domestic gypsum industry is large and is dominated by a few large vertically integrated companies that mine and calcine gypsum and manufacture plaster and wallboard products. These companies also sell crude gypsum for use in cement and agriculture. The large wallboard producers, through foreign subsidiaries, produce most of the crude gypsum that is imported to feed coastal wallboard plants. Plants on the east coast import mostly from Canada's Maritime Provinces, while plants on the west coast import gypsum from Mexico. Crude gypsum from Spain, the other major source of U.S. imports, is used mainly by cement plants.

Gypsum production is worldwide, with at least 80 countries known to produce. Because of its wide distribution and plentiful supply, most of the world's production is consumed domestically. Exceptions include Canada and Mexico, which export significant portions of their production to the United States; Thailand and Australia, which export to much of the Southeast Asia market; and Spain, which exports to the United States, Scandinavia, and other countries. In the United States and other industrialized nations, the major use of gypsum is in the manufacture of gypsum wallboard products. Most crude gypsum is mined in rural areas and shipped to urban areas for manufacture into wallboard and ultimate consumption. In developing countries, most gypsum is consumed by local cement plants.

Geology-Resources

Gypsum deposits may be found in any geologic era, but they are most common in the Permian. They are frequently found in association with the source rocks for petroleum. Most massive gypsum and anhydrite deposits occur as large, lenticular, stratified bodies that were formed by evaporation of seawater in basins that have one or more restricted openings to the sea. The basins range in diameter from a few miles to many hundreds of miles.

Classic evaporite formation involves the deposition of anhydrite, with later hydration of the anhydrite by meteoric waters to gypsum at depths ranging from 0 to 1,000 feet. The depth of hydration is generally related to topography, structure, and climate, because these factors affect the depth of ground water and surface water penetration.

Technology

Gypsum deposits are explored to determine their physical and chemical properties and to determine a minable thickness and the ratio of gypsum to anhydrite. The depth of hydration is important in mining because the presence of only a few percent anhydrite is sufficient to render gypsum unusable for making plaster. Adequate samples may be obtained from outcrops or drill cores.

Deposits near the surface are developed by stripping the overburden, developing either single- or multiple-bench open pits, and constructing access and transportation routes. Underground ore bodies are developed by sinking shafts or driving adits, with mining development and production by the room-and-pillar system.

Most domestic gypsum is produced from surface mines using standard open pit mining methods. In a typical domestic mine, the gypsum is drilled and blasted as needed, probably every week or two. Broken gypsum rock, loaded with hydraulic shovel or front-end loader, is hauled to the primary crusher by a fleet of three or four 35-ton haultrucks. All material removed from the mines is crude gypsum. All waste is left in the mine.

The processing of crude gypsum depends on the end use. Gypsum for use in cement is crushed to minus 1-1/2 inch plus 3/8 inch. For agricultural or filler use, the gypsum is pulverized to 100 mesh or finer.

To produce plaster and wallboard products, minus 100-mesh gypsum is heated in batch kettles

to remove three-quarters of the water of crystallization, converting gypsum, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, to the hemihydrate product, $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$. A few rotary kilns are also used, in which case a coarse feed with fines removed is calcined. During the commercial calcining process, gypsum is heated to 250°F for about 2 hours, then the temperature rapidly rises to 300° to 350°F , at which time the calcine, called stucco, is dumped into a hot pit. The calcine is then mixed with various additives, including a retarder or accelerator, and manufactured into prefabricated wallboard products and other plaster and cement products.

Plaster is generally reground calcine, modified with retarders or accelerators and containing various binders such as hair, sisal, fiberglass, aggregates, or colored pigments. Retarders, usually glue, starch, or slaughterhouse byproducts, can increase the setting time to as much as 6 hours. Accelerators, such as metal salts, set plaster, or anhydrite, can reduce the setting time to less than 5 minutes. The plaster is packed in bags and sold under various trade names.

Prefabricated products include lath, veneer base, sheathing, and wallboard. These board products are manufactured by continuous methods on automatic machines that can be adjusted to any of the standard products. A slurry of wet plaster with additives and an accelerator is spread between two moving sheets of paper. Moving through the shaping rolls, the edges are molded and sealed. The green board is run out on a traveling belt until the plaster has set. The board is then cut with a revolving knife into appropriate lengths and slowly passed through a drying kiln.

ANNUAL REVIEW

Production

The United States remained the world's leading producer of gypsum, accounting for 15% of the total world output. Crude gypsum was mined by 29 companies at 58 mines in 20 States. Production decreased 7%. Leading producing States, in descending order, were Iowa, Oklahoma, Michigan, Texas, Nevada, California, and Indiana. These seven States produced more than 1 million tons each and together accounted for 76% of total domestic production. Leading companies were USG Corp., 11 mines; National Gypsum Co., 7 mines; Georgia-Pacific Corp., 7 mines; Harrison Gypsum Inc., 2 mines; and Temple-Inland Forest Products Corp., 1 mine. These 5 companies, operating 28 mines, produced 69% of the total crude gypsum.

Leading individual mines, in descending order of production, were USG's Plaster City Mine, Imperial County, CA; USG's Sweetwater Mine, Nolan County, TX; USG's Alabaster Mine, Iosco County, MI; USG's Shoals Mine, Martin County, IN; USG's Sperry Mine, Des Moines County, IA; Harrison's Cement Mine, Caddo County, OK; National Gypsum's Tawas Mine, Iosco County, MI; Temple-Inlands's Fletcher Mine, Comanche County, OK; Pacific Coast Building Products Inc.'s (PABCO), Las Vegas Mine, Clark County, NV; and H. M. Holloway Inc.'s Lost Hills Mine, Kern County, CA. These 10 mines accounted for 43% of the national total. Average output for the 58 mines increased 4% to 283,000 tons.

Gypsum was calcined by 13 companies at 71 plants in 28 States, principally for the manufacture of gypsum wallboard and plaster. Calcined output decreased slightly in tonnage and value. Leading States, in descending order, were California, Iowa, Texas, Florida, Nevada, and New York. These 6 States, with 29 plants, accounted for 48% of the national output.

Leading companies were USG, 20 plants; National Gypsum, 18 plants; Georgia-Pacific, 10 plants; Domtar, 8 plants; and Celotex, 4 plants. These 5 companies, operating 60 plants, accounted for 83% of the national output.

Leading individual plants were, in descending order of production, USG's Plaster City plant, Imperial County, CA; USG's Jacksonville plant, Duval County, FL; USG's Sweetwater plant, Nolan

County, TX; USG's Sperry plant, Des Moines County, IA; USG's Baltimore plant, Baltimore County, MD; Briar Gypsum Co.'s Briar plant, Howard County, AR; National Gypsum's Tampa plant, Hillsborough County, FL; USG's Shoals plant, Martin County, IN; PABCO's Las Vegas Plant, Clark County, NV; and USG's Stony Point plant, Rockland County, NY. These 10 plants accounted for 29% of the national production. Average calcine production for the 71 U.S. plants was 247,000 tons, a slight decrease.

A total of 735,000 tons of byproduct gypsum, valued at \$3.1 million, was used, principally in agriculture, but some for gypsum wallboard manufacturing. Approximately 69% was of non-phosphogypsum origin compared with 76% in 1989.

According to the Gypsum Association, yearend gypsum wallboard plant capacity for producing 1/2-inch regular wallboard decreased slightly to 24.65 billion square feet per year. Total wallboard shipments were 20.9 billion square feet, 81% of capacity.

Improvements to existing plants and construction of new plants continued during the year. At the same time, some plants were closed. Domtar completed construction and began operating its Newington, NH, wallboard plant. The plant uses crude gypsum imported from Domtar's Flat Bay quarry in Newfoundland. Domtar closed, at least temporarily, its Florence wallboard plant in Fremont County, CO.

Eagle Gypsum Products began operation of its new wallboard plant in Eagle County, CO. Highland-American Corp. completed construction of its new gypsum fiberboard plant in East Providence, RI, and was expecting to begin full-scale production in early 1991. Centex American continued construction of its new wallboard plant in Bernalillo, NM. Windsor Gypsum Co.'s board plant at Tatum, TX, was closed during 1990.

TABLES 2 and 3 to be inserted here.

FIGURE 1 to be inserted here.

Consumption and Uses

Apparent consumption, defined as production plus net imports plus industry stock changes, of crude gypsum, including byproduct gypsum, remained about the same at 26.8 million tons. Net imports provided 36% of the crude gypsum consumed. Apparent consumption of calcined gypsum decreased slightly to 17.5 million tons.

Yearend stocks of crude gypsum at mines and calcining plants were 2.0 million tons. Of this, 44% was at calcining plants in coastal States.

Of the total gypsum products sold or used, 6.5 million tons, about 34%, was uncalcined. Uncalcined gypsum, crushed and screened to specifications, is marketed for use in portland cement manufacture, agriculture, and fillers. The cement industry uses gypsum to retard the setting time of concrete.

Finely ground gypsum rock is used in agriculture to neutralize alkaline and saline soils, improve the permeability of argillaceous materials, and provide sulfur and catalytic support for maximum fertilizer utilization and leguminous productivity. Small amounts of very pure gypsum are used as fillers and in glassmaking, papermaking, and pharmaceutical applications. In 1990, 67% of the uncalcined gypsum products was used in portland cement, and the remainder was used mainly for agricultural purposes.

Of the total calcined gypsum products, most went into prefabricated products. A small percentage was used in industrial and building plasters. Of the prefabricated products, based on surface square feet, 62% was regular wallboard; 28% was fire-resistant type X wallboard; 3% was 5/16-inch mobile home board; and 3% was water- and/or moisture-resistant board. Lath, veneer base,

sheathing, predecorated, and other types made up the balance. Of the regular wallboard, 85% was 1/2 inch and 11% was 5/8 inch.

In descending order, the leading sales regions for prefabricated products were the South Atlantic, Pacific, East North-Central, and Middle Atlantic. Together they accounted for 68% of the total.

TABLES 4 and 5 to be inserted here.

FIGURE 2 to be inserted here.

Markets and Prices

On an average value-per-ton basis, f.o.b. mine or plant, crude gypsum decreased 17% to \$6.07, calcined gypsum decreased slightly to \$15.87, and byproduct gypsum increased 6% to \$4.27. Prefabricated products were valued at \$84.58 per ton, plasters at \$128.42 per ton, and uncalcined products at \$13.29 per ton.

According to the Department of Commerce, the average producer price of regular 1/2-inch wallboard was 6% lower in 1990 than in 1989, and type X board was 4% lower.¹

Lower demand and lower prices, especially for gypsum wallboard products, have caused difficult times for much of the industry. Two companies, Celotex and National, filed for bankruptcy protection under chapter 11, and USG, the country's largest producer, was struggling to restructure its debt load.

Foreign Trade

Imports for consumption of crude gypsum decreased 6% to 8.7 million tons and represented 36% of apparent consumption. Crude gypsum from Canada and Mexico was used mainly to feed wallboard plants in coastal cities. Imports from Spain, the other major source of imported gypsum, were used mostly for portland cement manufacture. Gypsum wallboard imports, principally from Canada, decreased 15% to 303 million square feet. The decrease is a reflection of fewer housing starts in the United States.

Tables 6 and 7 to be inserted here.

World Review

Estimated world production of crude gypsum decreased slightly to 108 million tons. Total world production figures are probably low because, in some countries, significant production was consumed captively and not reported. Also, production from small deposits in developing countries was intermittent and often unreported. The United States remained the world's largest producer of crude gypsum with 15% of the world total.

Canada. — Louisiana-Pacific Panel Products Ltd. completed construction of its new fiber gypsum board plant in Sydney, Nova Scotia. Commercial production was to begin in 1991.

The Gypsum Association in the United States, of which all Canadian wallboard producers were members, reported that yearend capacity of 1/2-inch regular wallboard in Canada was 3.92 billion square feet, an increase of 5% compared with that of the previous year.

France. — BPB Industries PLC of the United Kingdom acquired the plaster and gypsum operations of Poliet Group. The operations included six plaster mills, seven gypsum block factories and one plasterboard plant in various locations throughout France and several mines near Paris.²

Germany, Federal Republic of. — Harzer Gipswerke Rottleberode GmbH, the major producer in Eastern Germany, was purchased by Gebr. Knauf Westdeutsche Gipswerke, Germany's largest producer.³

Ireland. — North West Exploration PLC awarded a contract to Ortech MCS Ltd. for a feasibility

study on its Glangevlin deposit in County Cavan. The study will be a detailed assessment of the mining and processing of the gypsum and the manufacturing and marketing of gypsum products.⁴

Netherlands. — Novem BV, the Dutch agency for energy and the environment, was supporting a Dutch-German joint venture to demonstrate a novel process for using gypsum from flue gas desulfurization for making self-leveling mortars and as a setting time regulator in cement.⁵

Spain. — Controlling interest in Spain's largest plaster producer, Inveryeso S.A., was acquired by BPB Industries PLC of the United Kingdom. Inveryeso, with 20 plaster mills, had about 50% of the plaster market.⁶

United Kingdom. — LaFarge Coppee of France and Redland PLC of the United Kingdom entered into a joint venture that became Europe's second largest gypsum wallboard producer.

LaFarge bought the interests of CSR Ltd. of Australia in a previous joint venture with Redland.⁷

British Gypsum Ltd., a subsidiary of BPB Industries PLC, contracted for the purchase of up to 1 million tons per year of flue gas desulfurization gypsum from the Drax powerplant in Yorkshire. Delivery was expected to begin in 1993 with 200,000 tons and then increase in later years.⁸

Knauf UK signed a long-term contract with Tioxide UK for byproduct gypsum to be produced at Tioxide's Grimsby facility. Knauf will use the gypsum at its Immingham board plant beginning in 1992.⁹

TABLE 8 to be inserted here.

OUTLOOK

More than 90% of the gypsum consumed annually in the United States is used in construction, mainly in gypsum wallboard products, building plasters, and in the manufacture of portland cement. With new housing starts decreasing each year since 1986 and an oversupply of office space, demand for gypsum products is expected to decrease slightly in 1991, then slowly increase for the next several years as the economy improves and construction activity increases.

¹International Trade Administration (Dep. of Commerce). Construction Review. V. 37, No. 2, Mar.-Apr. 1991, p. 41.

²Industrial Minerals (London). No. 276, Sept. 1990, p. 15

³Falk, L. and D. Hausser. The Eastern German Industrial Minerals Contribution. Ind. Miner. (London), No. 279, Dec. 1990, pp. 24-49

⁴Industrial Minerals. No. 271, Apr. 1990, p. 13.

⁵— — —. No. 278, Nov. 1990, p. 18.

⁶— — —. No. 275, Aug. 1990, p. 15-17.

⁷Rock Products. V. 93, No. 11, Nov. 1990, p. 70.

⁸Industrial Minerals (London). No. 273, June 1990, pp. 9-11.

⁹— — —. No. 279, Dec. 1990, p. 13.

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Nonmetallic Minerals, McGraw-Hill, 1951.

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OUTLOOK

OTHER SOURCES OF INFORMATION

The Gypsum Association, 1000 North Dearborn Street, Chicago, Ill. 60610.

Members reported that gypsum is used in a variety of ways, including as a soil conditioner, a fertilizer, and a component in the manufacture of various products.

Gypsum is also used in the manufacture of various products, including as a soil conditioner, a fertilizer, and a component in the manufacture of various products.

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Table 1.--Salient gypsum statistics
(Thousand short tons and thousand dollars)

	1986	1987	1988	1989	1990
United States:					
Active mines and plants ^{1/} -----	113	109	112	112	106
Crude:					
Mined-----	15,403	15,612	16,390	17,624	16,406
Value-----	\$99,570	\$106,977	\$109,205	\$128,448	\$99,567
Imports for consumption-----	9,559	9,717	9,679	9,304	8,726
Byproduct gypsum sales-----	653	688	733	725	735
Calcined:					
Produced-----	17,061	17,592	17,274	17,893	17,553
Value-----	\$310,353	\$321,645	\$313,251	\$285,659	\$278,607
Products sold (value)-----	\$2,514,432	\$2,278,822	\$2,090,786	2/\$1,926,676	2/\$1,712,848
Exports (value)-----	\$28,805	\$32,061	\$42,789	\$60,311	\$84,452
Imports for consumption (value)-----	\$181,168	\$163,581	\$158,169	\$111,012	\$110,205
World: Production-----	r/97,256	r/102,154	103,499	p/109,023	e/107,671

e Estimated. p Preliminary. r Revised.

1/Each mine, calcining plant, or combination mine and plant is counted as one establishment; includes plants that sold byproduct gypsum.

2/Does not include value of plasters sold.

Table 2.--Crude gypsum mined in the United States, by State

State	1989			1990		
	Active mines	Quantity (thousand short tons)	Value (thousands)	Active mines	Quantity (thousand short tons)	Value (thousands)
Arizona, New Mexico-----	6	561	\$3,132	6	778	\$5,658
Arkansas, Kansas, Louisiana-----	5	1,836	13,097	5	1,608	11,413
California, Nevada, Utah-----	14	3,526	26,905	11	3,209	16,955
Colorado, Montana, 1/ South Dakota, Washington, Wyoming-----	10	673	5,202	7	522	3,751
Indiana, New York, Ohio, Virginia-----	5	2,149	16,226	5	2,046	14,715
Iowa-----	6	2,273	16,884	6	2,192	14,243
Michigan-----	5	2,089	15,589	5	2,000	11,511
Oklahoma-----	8	2,523	14,369	7	2,184	11,154
Texas-----	6	1,993	17,044	6	1,868	10,166
Total ^{2/} -----	65	17,624	128,448	58	16,406	99,567

1/1989 only.

2/Data may not add to totals shown because of independent rounding.

Table 3.--Calcined gypsum produced in the United States by State

State	1989			1990		
	Active plants	Quantity (thousand short tons)	Value (thousands)	Active plants	Quantity (thousand short tons)	Value (thousands)
Arizona, Colorado, New Mexico, Utah-----	5	651	\$7,831	5	661	\$5,689
Arkansas, Louisiana, Oklahoma-----	7	1,982	25,741	7	1,958	23,263
California-----	6	1,958	32,401	6	2,031	32,225
Delaware, Maryland, North Carolina, Virginia-----	6	1,708	28,155	6	1,688	33,174
Florida-----	3	1,303	21,066	3	1,264	25,474
Georgia-----	3	724	12,022	3	694	10,692
Illinois, Indiana, Kansas-----	6	1,513	24,721	6	1,467	22,242
Iowa-----	5	1,490	24,575	5	1,506	20,351
Massachusetts, New Hampshire, New Jersey--	4	832	14,410	5	984	18,951
Michigan-----	4	650	10,677	4	637	11,809
Nevada-----	4	1,186	19,075	4	1,191	15,360
New York-----	4	1,093	15,646	4	1,053	19,787
Ohio-----	3	458	7,405	3	415	7,716
Texas-----	7	1,584	23,918	6	1,311	15,466
Washington, Wyoming-----	4	761	18,016	4	694	16,408
Total1/-----	71	17,893	285,659	71	17,553	278,607

1/Data may not add to totals shown because of independent rounding.

Table 4.--Gypsum products (made from domestic, imported, and byproduct gypsum) sold or used in the United States, by use

(Thousand short tons and thousand dollars)

Use	1989		1990	
	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement-----	3,422	41,834	4,355	46,660
Agriculture and miscellaneous1/-----	2,094	32,310	2,099	39,143
Total2/-----	5,516	74,145	6,454	85,803
Calcined:				
Plasters-----	W	W	W	W
Prefabricated products3/-----	21,552	1,852,531	19,237	1,627,045
Total calcined2/ 4/-----	21,552	1,852,531	19,237	1,627,045
Grand total2/ 4/-----	27,068	1,926,676	25,691	1,712,848

W Withheld to avoid disclosing proprietary data.

1/Includes byproduct gypsum.

2/Data may not add to totals shown because of independent rounding.

3/Includes weight of paper, metal, or other materials and some byproduct gypsum.

4/Data does not include plasters.

Table 5.--Prefabricated gypsum products sold or used in the United States

Product	1989			1990		
	Thousand square feet	Thousand short tons1/	Value (thousands)	Thousand square feet	Thousand short tons1/	Value (thousands)
Lath:						
3/8 inch-----	15,319	11	\$2,747	14,700	11	\$2,563
1/2 inch-----	460	(2/)	61	300	(2/)	46
Other-----	3,480	3	532	--	--	--
Total3/-----	19,259	15	3,339	15,000	11	2,608
Veneer base-----	476,330	478	40,810	440,040	453	34,940
Sheathing-----	310,880	301	36,543	253,044	245	33,126
Regular gypsumboard:						
3/8 inch-----	891,365	819	100,335	433,512	348	41,299
1/2 inch-----	11,187,062	9,830	802,976	10,454,624	9,448	750,560
5/8 inch-----	1,303,673	2,244	101,706	1,319,403	1,354	62,438
1 inch-----	76,604	94	16,712	47,780	56	10,439
Other4/-----	80,820	62	8,834	113,079	75	25,624
Total3/-----	13,539,524	13,050	1,030,564	12,368,398	11,280	890,360
Type X gypsumboard-----	6,027,090	6,398	537,116	5,513,055	5,977	485,342
Predecorated wallboard-----	129,341	122	41,427	106,550	103	33,316
5/16-inch mobile home board-----	725,283	549	67,049	646,631	516	57,938
Water/moisture-resistant board---	587,830	557	77,385	543,184	527	69,516
Other-----	83,561	83	18,297	114,240	125	19,900
Grand total3/-----	21,899,098	21,552	1,852,531	20,000,142	19,237	1,627,045

1/Includes weight of paper, metal, or other material.

2/Less than 1/2 unit.

3/Data may not add to totals shown because of independent rounding.

4/Includes 1/4-, 7/16-, and 3/4-inch gypsumboard.

Table 6.--Imports for consumption of crude gypsum, by country

(Thousand short tons and thousand dollars)

Country	1989		1990	
	Quantity	Value	Quantity	Value
Australia-----	23	201	20	172
Canada1/-----	6,285	41,964	6,349	45,314
China-----	13	95	35	421
Jamaica-----	--	--	24	163
Mexico-----	2,353	11,606	1,698	8,741
Morocco-----	12	60	49	269
Spain-----	618	5,142	550	5,696
Other-----	(2/)	40	1	232
Total3/-----	9,304	59,107	8,726	61,009

1/Includes anhydrite.

2/Less than 1/2 unit.

3/Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

Table 7.--Summation of U.S. gypsum and gypsum products trade data
(Thousand short tons and thousand dollars)

Year	Crude1/		Plasters2/		Boards3/		Other4/	Total5/
	Quantity	Value	Quantity	Value	Quantity	Value	Value	Value
Exports:								
1986-----	15	1,056	141	14,425	NA	9,299	4,025	28,805
1987-----	4	696	123	14,933	NA	11,444	4,988	32,061
1988-----	5	668	266	18,694	NA	16,531	6,896	42,789
1989-----	108	2,286	106	15,914	97	25,140	16,972	60,311
1990-----	129	5,056	94	18,381	69	30,959	30,056	84,452
Imports for consumption:								
1986-----	9,559	64,996	3	436	811	99,089	16,646	181,168
1987-----	9,717	59,171	2	384	715	82,220	21,806	163,581
1988-----	9,679	59,166	2	670	637	70,866	27,467	158,169
1989-----	9,304	59,107	3	270	355	29,355	22,280	111,012
1990-----	8,726	61,009	1	236	272	22,786	26,174	110,205

NA Not available or Revised.

1/Import and export data for 1989 and 1990 are for "Gypsum; anhydrite," Harmonized Tariff Schedule 2520.10. Data for 1986-88 are for "Plaster rock or gypsum: Not ground and not wholly or partly calcined," TSUS 512.21. The two categories might not be comparable.

2/Import and export data for 1989 and 1990 are for "Plasters," Harmonized Tariff Schedule 2520.20. Data for 1986-88 are for "Plaster rock or gypsum: Ground, wholly or partly calcined, or both," TSUS 512.24. The two categories might not be comparable.

3/Import and export data for 1989 and 1990 are for "Boards, sheets, panels, tiles and similar articles, not ornamented: Faced or reinforced with paper or paperboard only," Harmonized Tariff Schedule 6809.11. Data for 1986-88 are for "Gypsum or plaster building boards and lath" TSUS 245.70. The two categories might not be comparable.

4/Import and export data for 1989 and 1990 are for "Boards, sheets panels, tiles and similar articles, not ornamented: other," Harmonized Tariff Schedule 6809.19 and "Other articles," Harmonized Tariff Schedule 6809.90. Data for 1986-88 are for "Cement of gypsum," TSUS 512.31 and 512.35, "Articles n.s.p.f. of Plaster of Paris," TSUS 512.41, and "Alabaster articles, n.s.p.f.," TSUS 513.94. Data for 1989 and 1990 might not be comparable that of previous years.

5/Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

Table 8.--Gypsum: World production, by country/
(Thousand short tons)

Country	1986	1987	1988	1989p/	1990e/
Afghanistane/-----	3	3	3	3	3
Algeriae/ 2/-----	303	303	303	303	303
Angolae/-----	22	22	r/63	r/63	63
Argentina-----	509	682	573	444	440
Australia-----	1,842	1,742	1,801	e/1,980	1,980
Austria3/-----	774	732	796	689	700
Boliviae/-----	r/1	r/1	r/1	r/1	1
Brazil (direct sales plus beneficiated)-----	693	727	715	e/720	720
Bulgaria-----	435	337	442	497	4/545
Burma5/-----	r/29	r/25	35	35	4/34
Canada (shipments)3/-----	9,704	9,980	10,485	9,035	4/9,041
Chile-----	213	259	348	306	4/278
Chinae/-----	7,200	7,900	8,900	8,900	8,800
Colombia-----	325	333	338	610	550
Cubae/-----	145	145	145	145	145
Cyprus-----	33	50	36	12	12
Czechoslovakia-----	819	r/850	853	877	875
Dominican Republic-----	146	65	169	188	165
Ecuador-----	320	r/32	r/ e/55	53	55
Egypt-----	998	1,200	e/1,200	1,443	1,440
El Salvadore/-----	5	5	5	5	5
Ethiopiae/ 6/-----	1	2	2	2	2
France3/-----	5,797	5,962	6,204	6,266	6,200
Germany, Federal Republic of: Eastern states/-----	375	353	353	342	330
Western states (marketable)3/-	2,090	1,882	1,921	e/2,040	1,980
Greece/-----	r/550	550	550	r/500	500
Guatemala-----	31	26	38	31	33
Hondurase/-----	25	25	25	25	25
Hungarye/ 3/-----	20	111	4/130	127	127
India-----	r/1,808	r/1,911	1,570	1,697	1,760
Iran2/ 7/-----	8,942	8,430	8,662	r/ e/8,800	8,800
Iraqe/-----	330	390	390	500	520
Ireland-----	318	313	359	346	350
Israel-----	51	39	34	33	42
Italy-----	1,372	1,339	e/1,430	e/1,380	1,380
Jamaica-----	129	194	160	86	4/91
Japane/-----	7,000	6,600	6,900	6,900	7,000
Jordan-----	77	126	94	146	145
Kenya3/-----	12	43	42	40	40
Laose/-----	r/33	77	88	115	125
Lebanone/-----	3	2	2	2	2
Libyae/-----	200	200	200	200	200
Luxembourge/-----	(8/)	(8/)	(8/)	(8/)	(8/)
Mauritania-----	20	21	r/ e/22	11	11
Mexico-----	4,666	5,044	5,269	5,942	4/6,615
Mongoliae/-----	35	35	35	35	35
Moroccoe/-----	500	500	500	500	500
Nicaragua-----	e/9	8	e/8	13	13
Nigere/-----	3	--	3	3	3
Pakistan-----	411	495	413	515	520
Paraguay-----	3	3	4	5	5
Peru-----	189	252	e/165	e/176	165
Phillipines-----	138	138	e/141	e/132	132
Poland3/-----	1,220	1,242	1,224	e/1,220	1,220
Portugal-----	292	356	373	e/330	330

see footnotes at end of table

Table 8.--Gypsum: World production, by country/ -- Continued
(Thousand short tons)

Country	1986	1987	1988	1989p/	1990e/
Romania/-----	1,760	1,650	1,760	1,760	1,650
Saudi Arabia/-----	4/411	411	413	413	413
Sierra Leone/-----	4	4	4	4	4
South Africa, Republic of-----	446	385	410	448	4/424
Spain-----	5,581	7,369	6,062	e/6,060	5,500
Sudan3/-----	e/8	e/8	6	11	11
Switzerland/-----	220	250	250	r/250	250
Syria-----	e/176	273	197	e/198	198
Taiwan-----	2	2	3	4	4
Tanzania3/-----	16	27	22	6	6
Thailand-----	1,836	3,341	5,014	6,038	4/6,342
Tunisia/-----	110	110	110	110	110
Turkey-----	141	333	255	246	250
U.S.S.R.-----	5,070	5,270	5,404	5,401	5,200
United Kingdom/ 3/-----	4/3,765	3,860	4,080	4,400	4,400
United States9/-----	15,403	15,612	16,390	17,624	4/16,406
Uruguay/-----	110	110	110	110	110
Venezuela-----	284	272	244	366	4/222
Vietnam/-----	30	30	30	30	30
Yemen, Republic of-----	58	165	176	e/175	175
Yugoslavia-----	656	610	612	600	610
Total-----	r/97,256	r/102,154	103,499	109,023	107,671

e/Estimated/ p/Preliminary. r/Revised.

1/Table includes data available through June 28, 1991.

2/Includes approximately 55,000 short tons of plaster a year.

3/Includes anhydrite.

4/Reported figure.

5/Data are for years beginning Apr. 1 of that stated.

6/Data are for years ending July 7 of that stated. Reported in cubic meters and estimated at 2.2 short tons per cubic yard.

7/Data are for years beginning Mar. 21 of that stated.

8/Less than 1/2 unit.

9/Excludes byproduct gypsum.

FIGURE 1
SUPPLY OF CRUDE GYPSUM
IN THE UNITED STATES

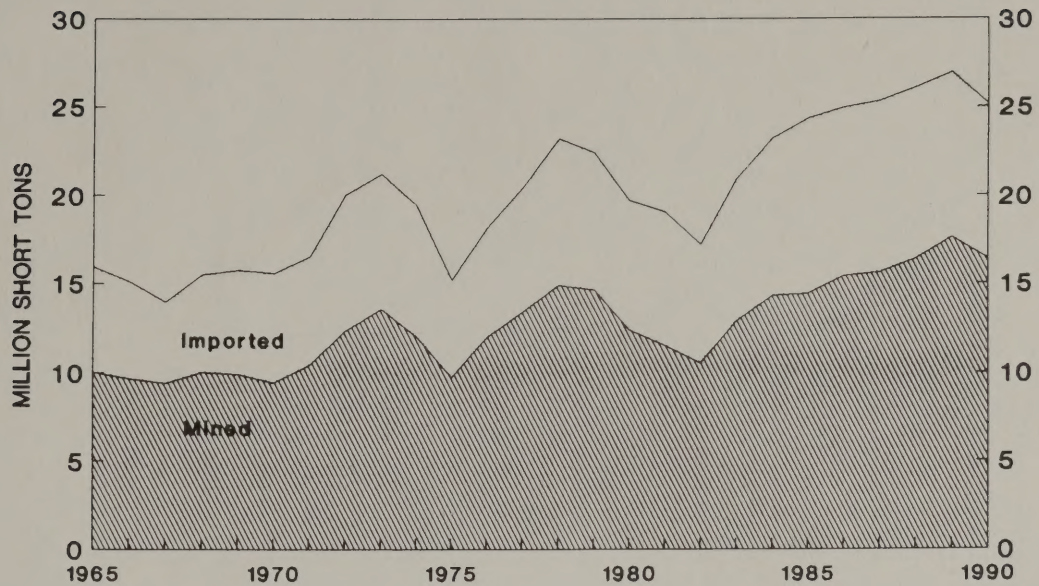
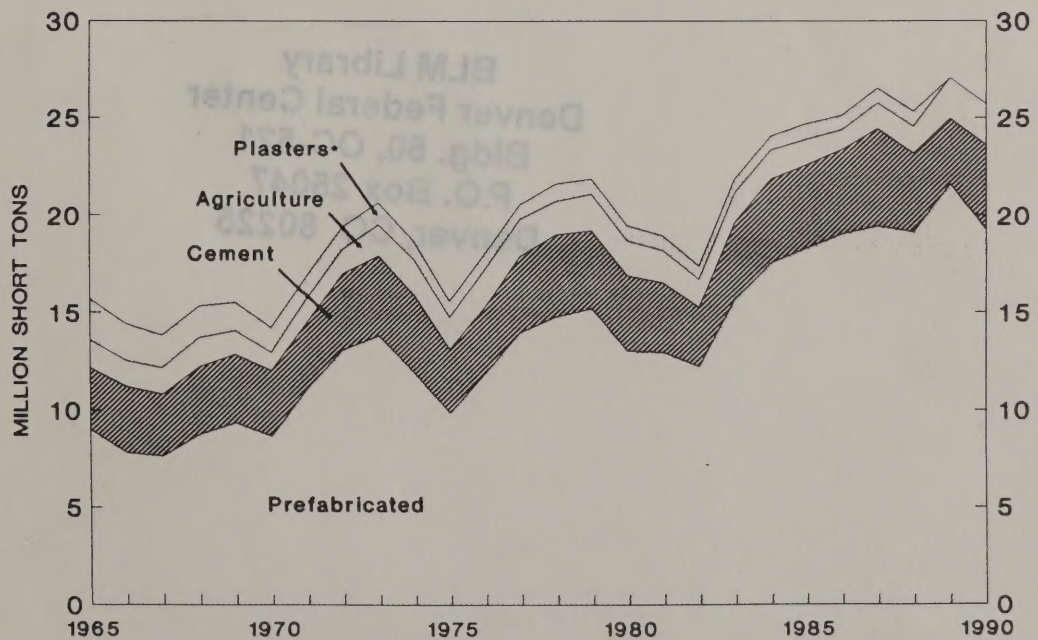
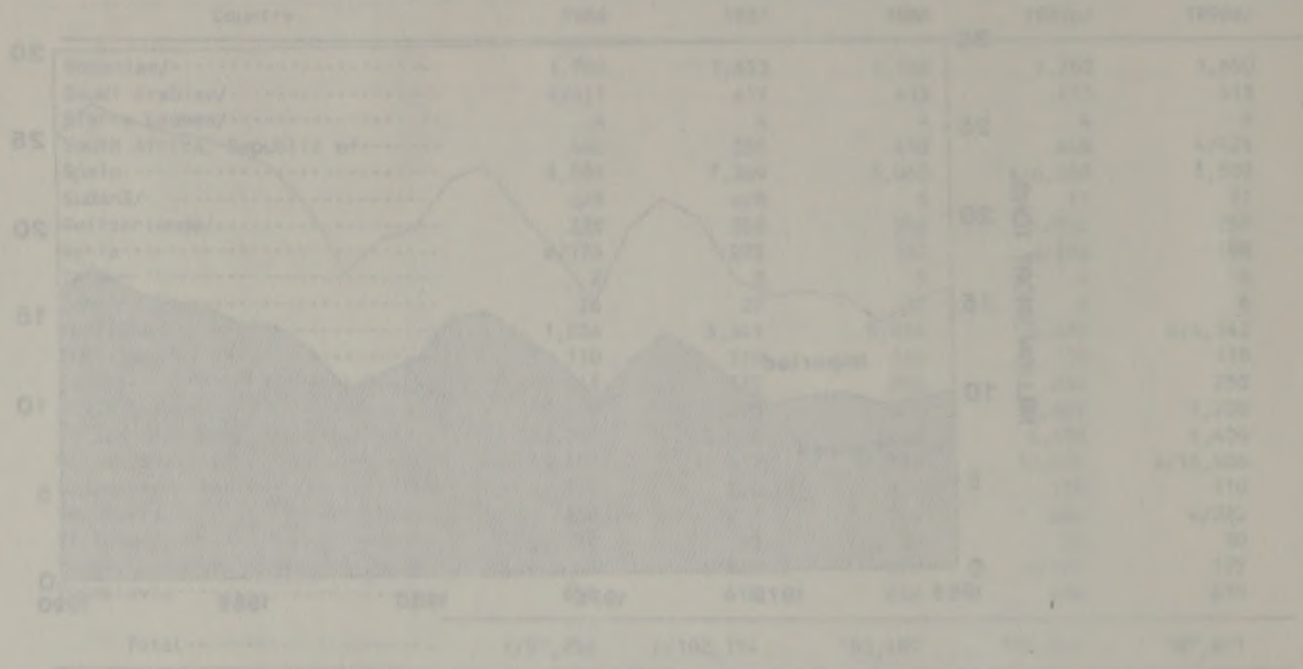


FIGURE 2
SALES OF GYPSUM PRODUCTS, BY USE

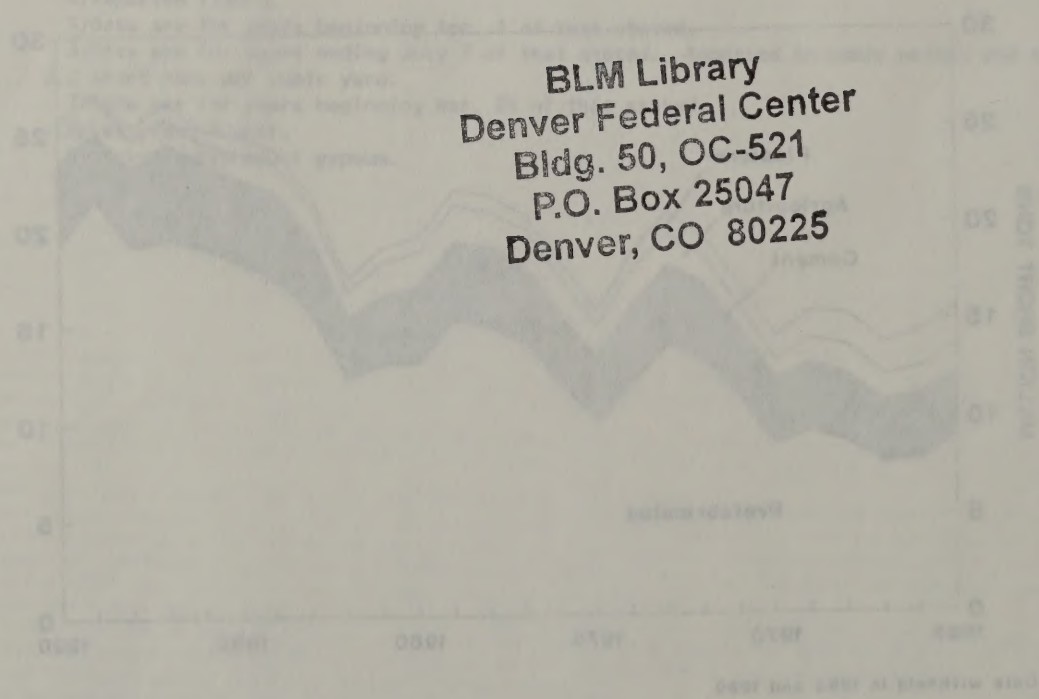


*Data withheld in 1989 and 1990

FIGURE 1 SUPPLY OF CRUDE GYPSUM IN THE UNITED STATES



SALES OF GYPSUM PRODUCTS BY USE



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